INTERNET OF WATER:
SHARING AND INTEGRATING WATER DATA FOR SUSTAINABILITY

THE ASPEN INSTITUTE ENERGY & ENVIRONMENT PROGRAM

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ASPEN INSTITUTE DIALOGUE SERIES ON WATER DATA

Sharing and Integrating Water Data for Sustainability

PURPOSE

How to create a national framework for sharing and integrate already existing publicly collected water data?

PARTICIPANTS

The Dialogue Series brought ~27 water experts, managers, policy makers, regulators, and representatives from the private and social sectors.

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Dialogue Series Participants

Xylem *Water Sage*
Microsoft *Esri*
Pioneer Resources
GE Water

AZ Department of Water
CA Water Board
TX Water Development Board
CO Water Conservation Board

E&J Gallo Winery
Iowa Ag. Water Alliance

CA Metropolitan Water District
D.C. Water
Milwaukee Metropolitan Sewerage District
Pecan Street

CUAHSI
WaDE

Environmental Defense Fund
American Rivers

USGS *NOAA*
EPA *ORNL*

Bechtel Foundation
Mitchell Foundation
Walton Family Foundation

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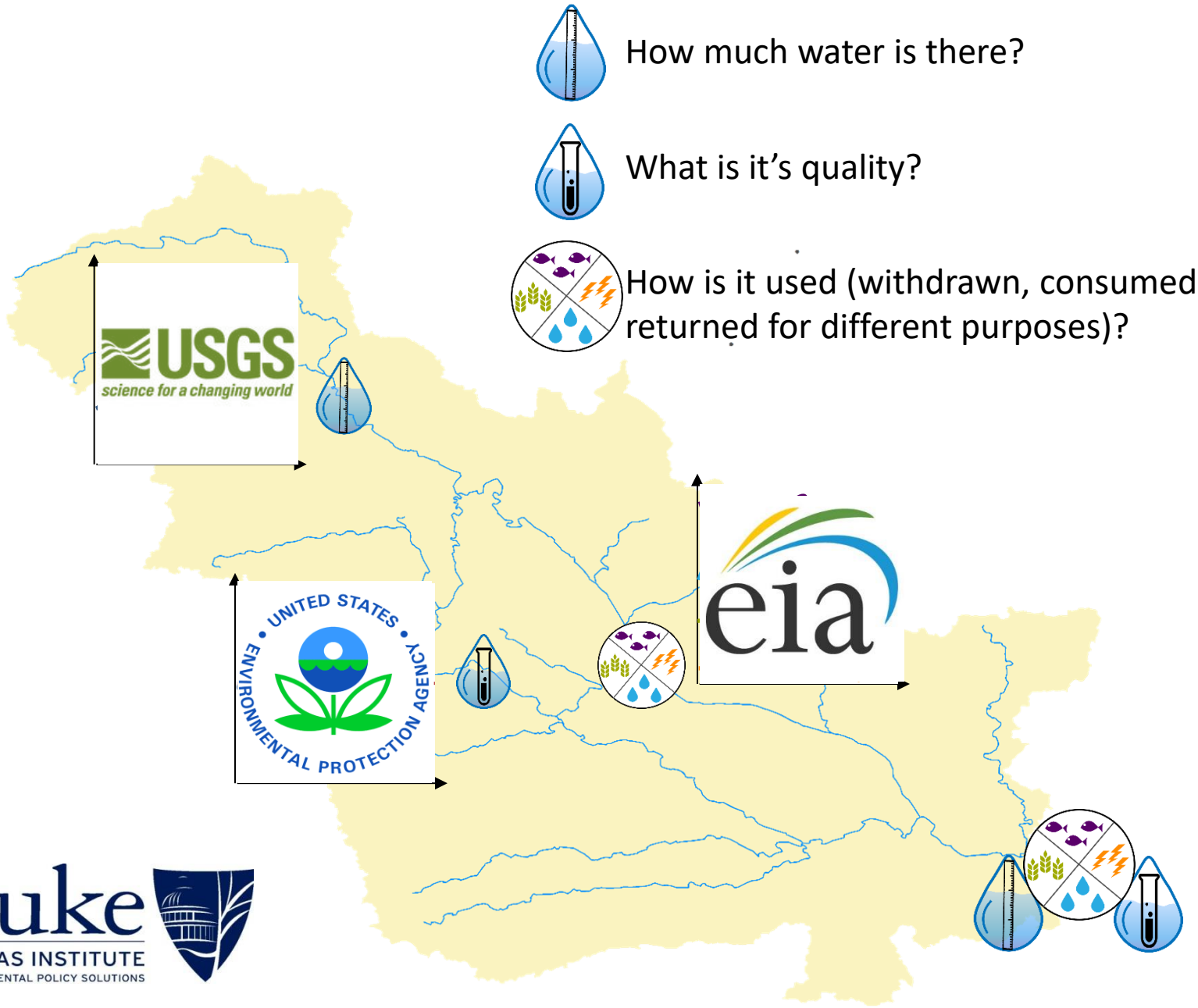
Why is a national water data policy important?



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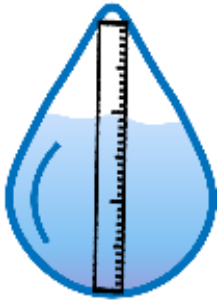
Water Data: Highly Fragmented



Observations:

Precipitation

Stream Gauge

Groundwater Wells

Reservoir Levels

Water Use

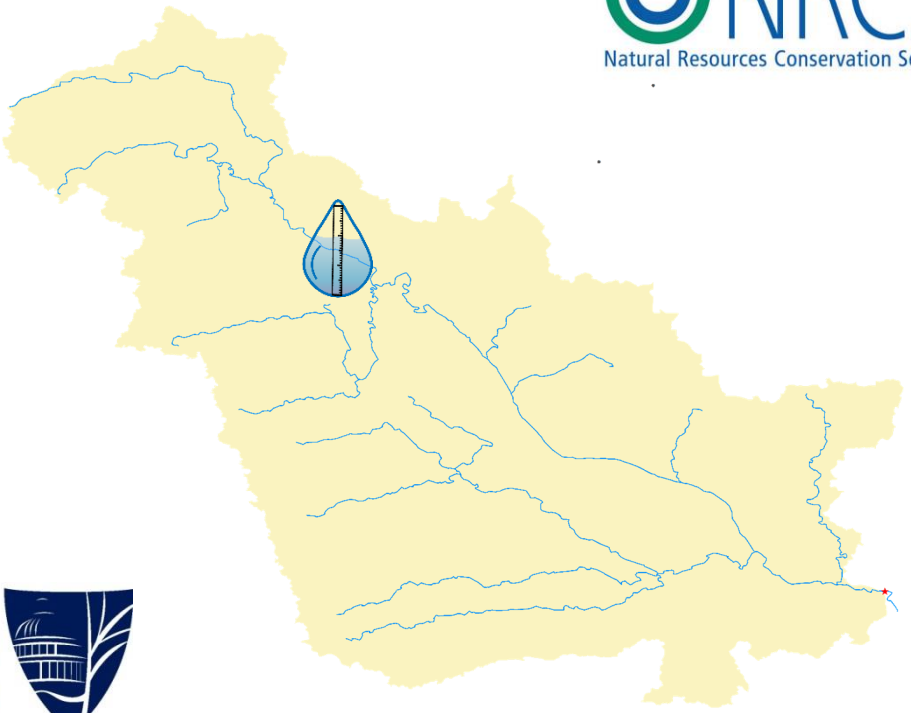
SNOTEL

NOAA

USGS
science for a changing world

US Army Corps of Engineers®

NRCS
Natural Resources Conservation Service



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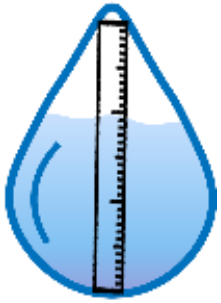


Models:

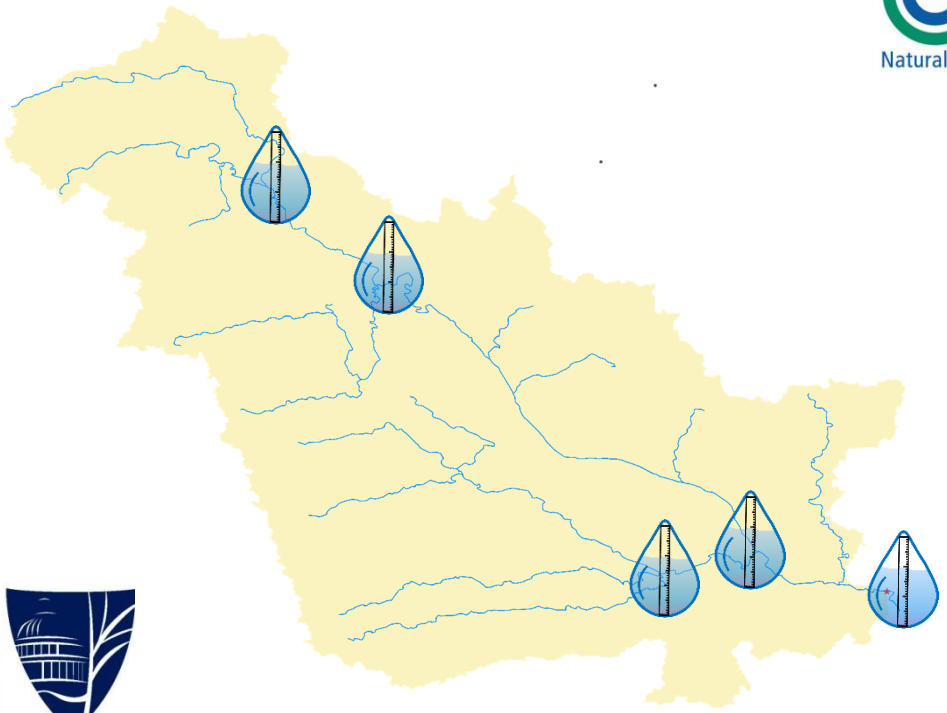
National Water Model

StreamStats

Riverware

HECRAS

Paleoclimate



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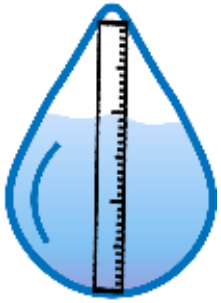


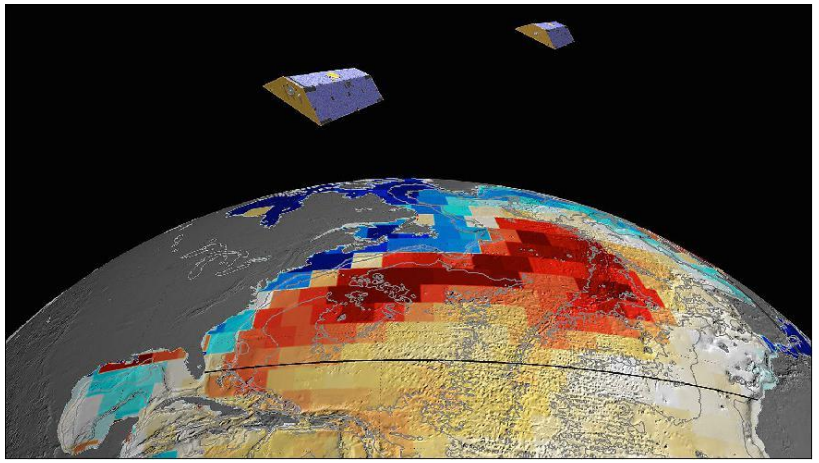
Satellites:

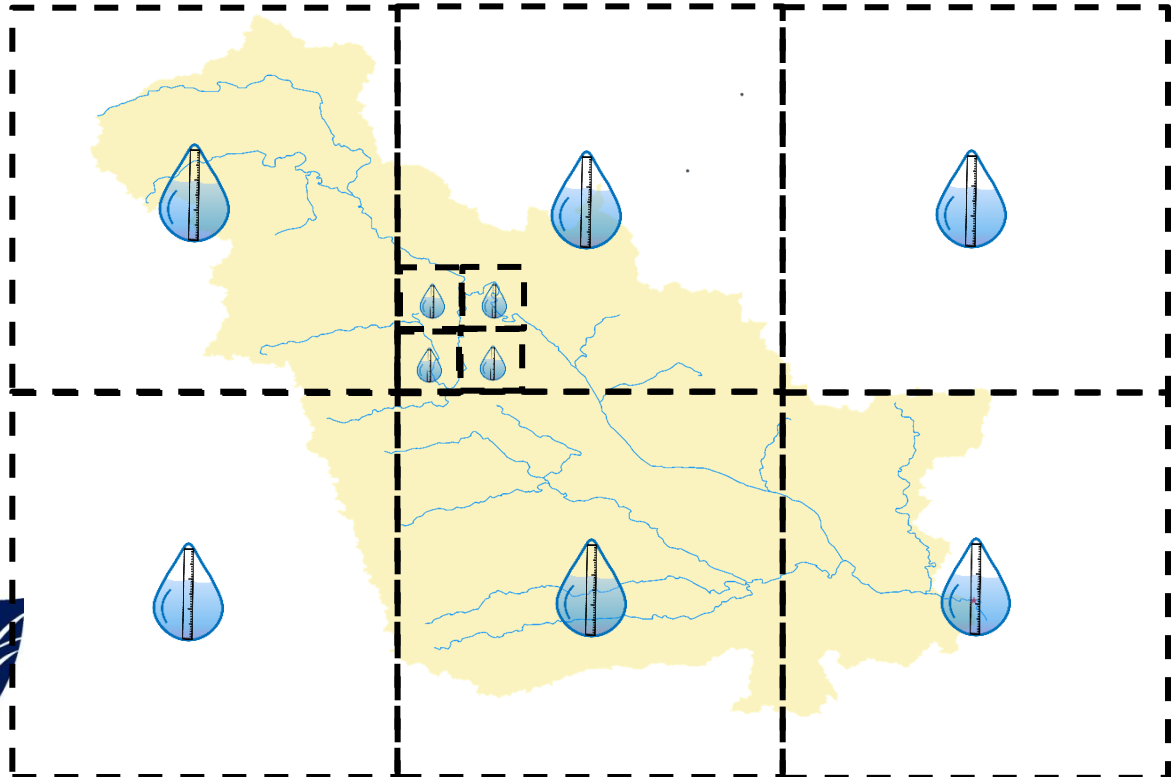
Soil Moisture

Groundwater

Water Vapor

Snow Cover





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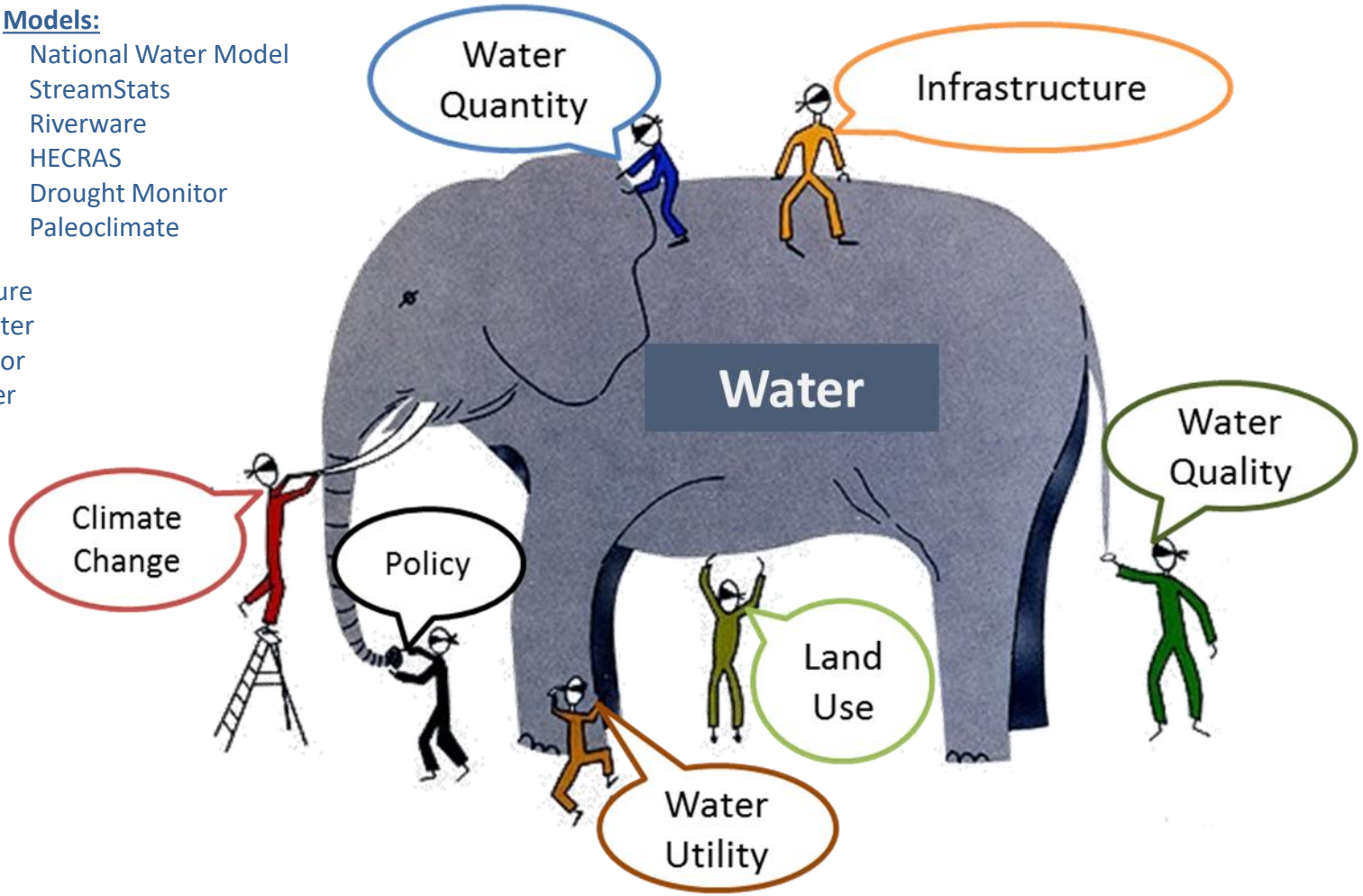
Water Data: Highly Fragmented

Observations:
- Precipitation
- Stream Gauge
- Groundwater Wells
- Reservoir Levels
- Water Use
- SNOTEL

Models:
- National Water Model
- StreamStats
- Riverware
- HECRAS
- Drought Monitor
- Paleoclimate

Satellites:
- Soil Moisture
- Groundwater
- Water Vapor
- Snow Cover



→ **Water data means very different things to different folks.**

→ **We might be coming to wrong interpretations.**

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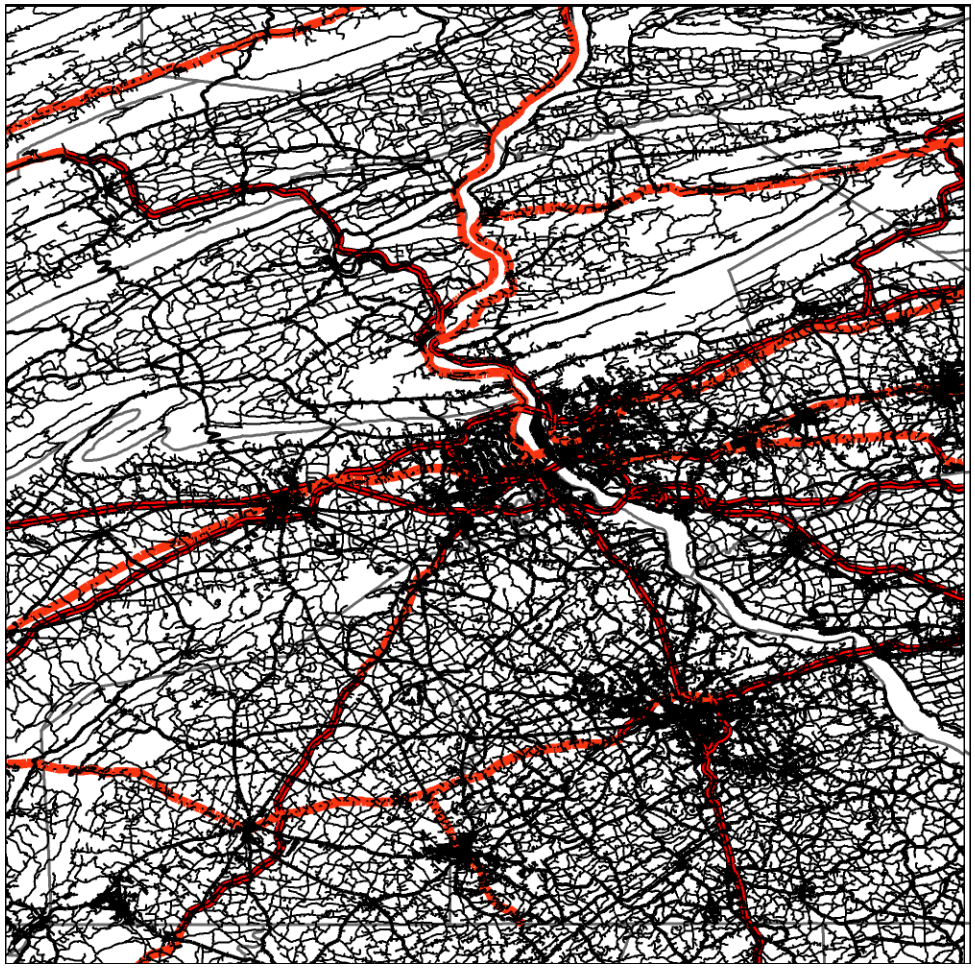
Water Data as Infrastructure



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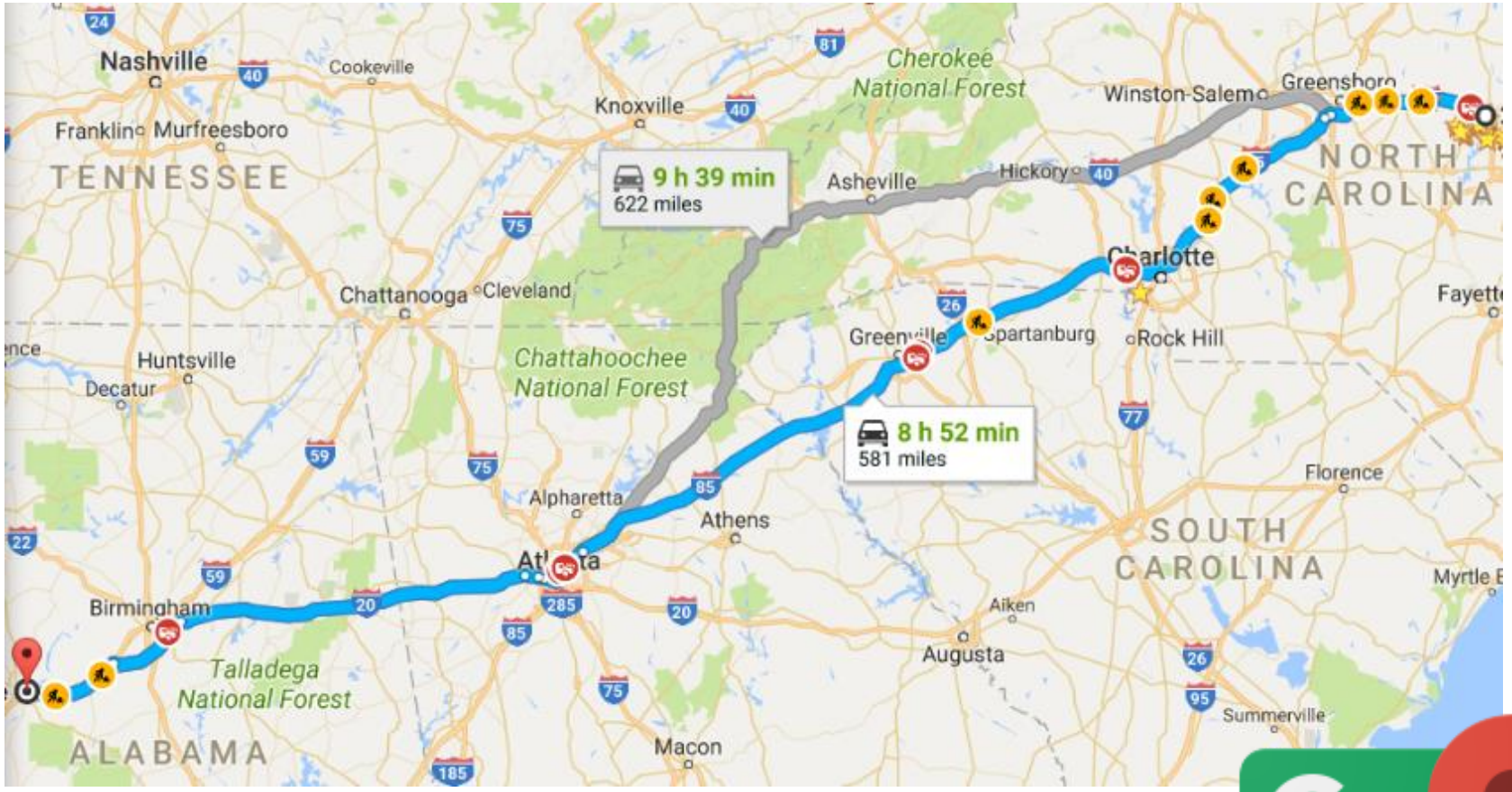
Water Data as Infrastructure



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Water Data as Connected, Integrated Infrastructure

WHAT ARE THE POSSIBILITIES?

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Key Findings

Water is undervalued, water data even more so.

Decisions are being made now without data, so just get the data out there!

The Internet of Water…

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Key Finding

Water is undervalued, water data even more so

→ A common foundation for decision-making

→ Improved data and analysis underpinning decision-making

→ Increased precision across sectors and purposes

→ Creating space for innovation

→ Public engagement and education

The value of open, shared, and integrated water data has not been widely quantified, documented or communicated.

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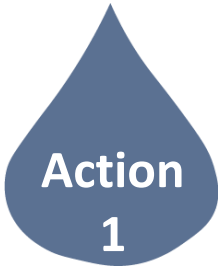
Next Steps for Key Finding 1



Putting numbers on the benefits of water data

Identify primary users of water data and start articulating the value of that data to different sectors

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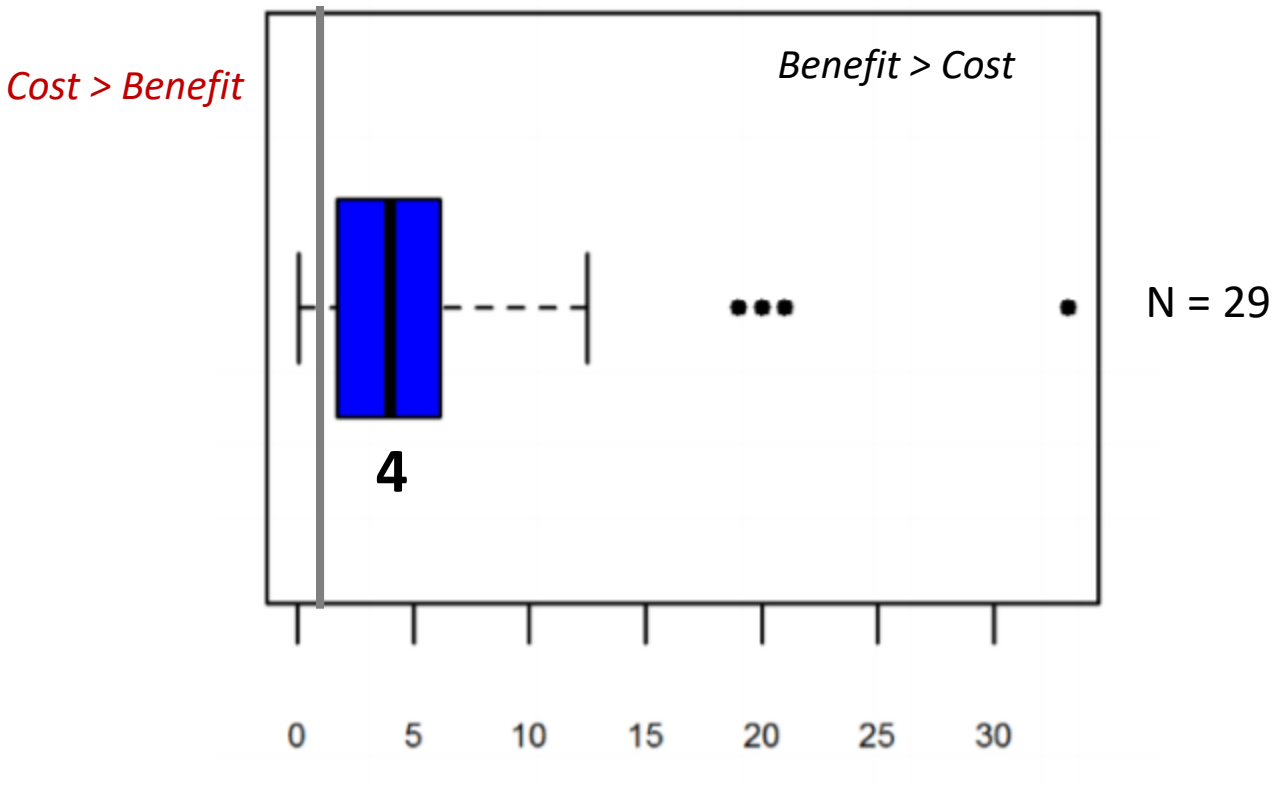
Action

1 Putting numbers on the benefits of water data



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Gardner et al., 2017. Estimating the Value of Public Water Data. NI WP 17-05.

Action

1 Putting numbers on the benefits of water data

California Irrigation Management Information System

Water Savings: 107,300 AF / yr

Financial Savings: $ 64.7 M / yr

Additional Benefits: Use of less pesticides, higher quality crops (less mold), turf agencies, lawyers for road accidents, tracking mosquito populations, and regulating temperatures in geothermal power plants.

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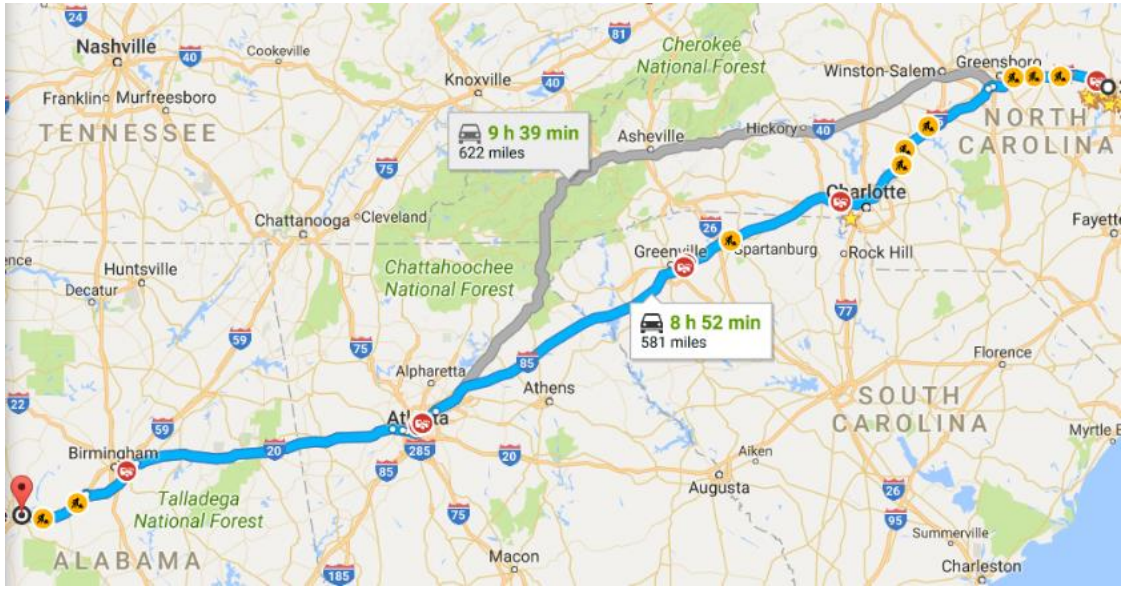
Key Finding

2

Decisions are being made now without data, so just get the data out there!

→ Making ***existing public water data*** open is a priority.

→ Executive order in 2013 that all new government data should be open and machine readable by default



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"Just get the data out there!"

Key Finding

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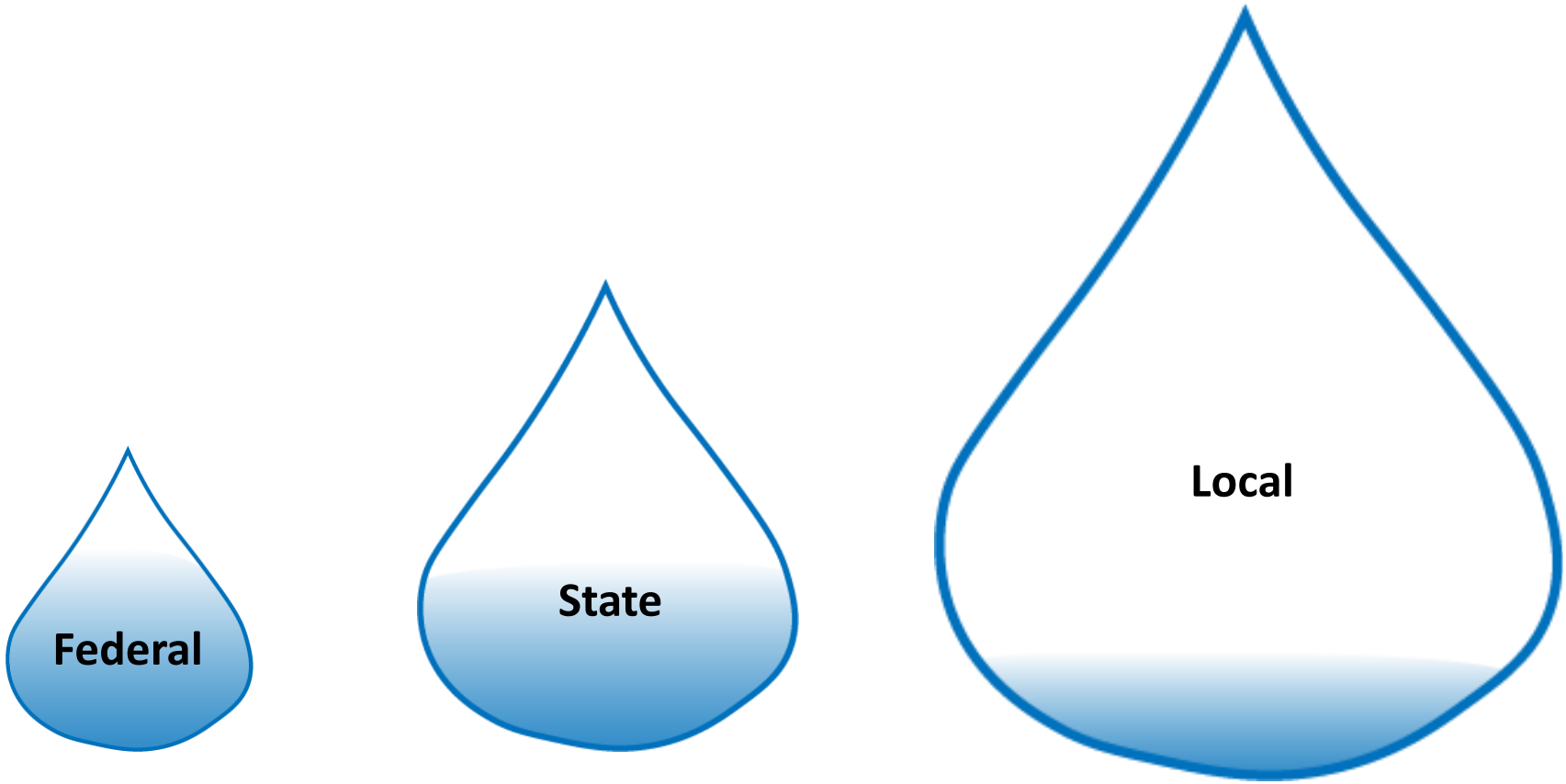
Decisions are being made now without data, so just get the data out there!



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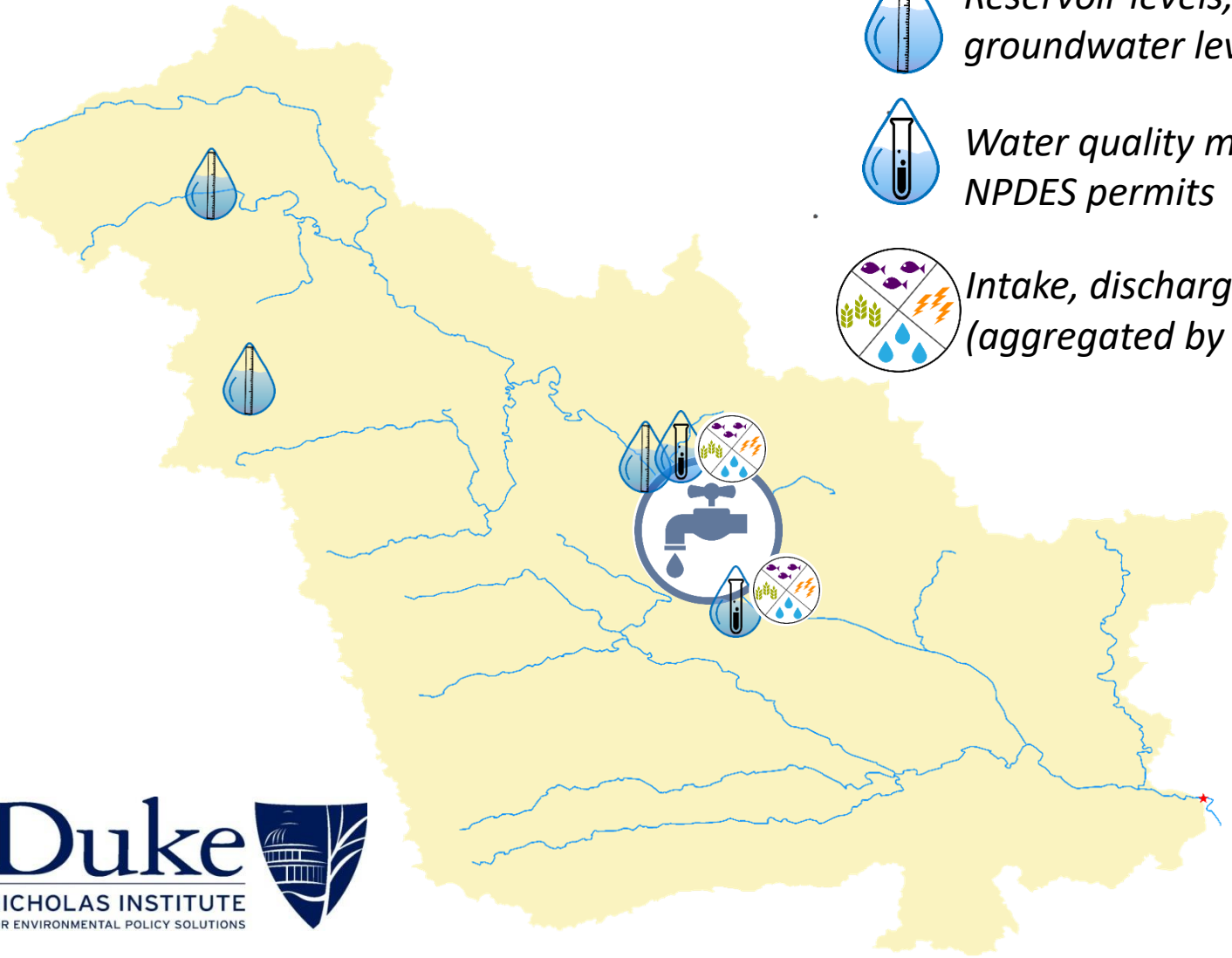

Reservoir levels, stream flow, groundwater levels…

Water quality measurements, NPDES permits

Intake, discharge, customer use (aggregated by sector)

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Key Finding

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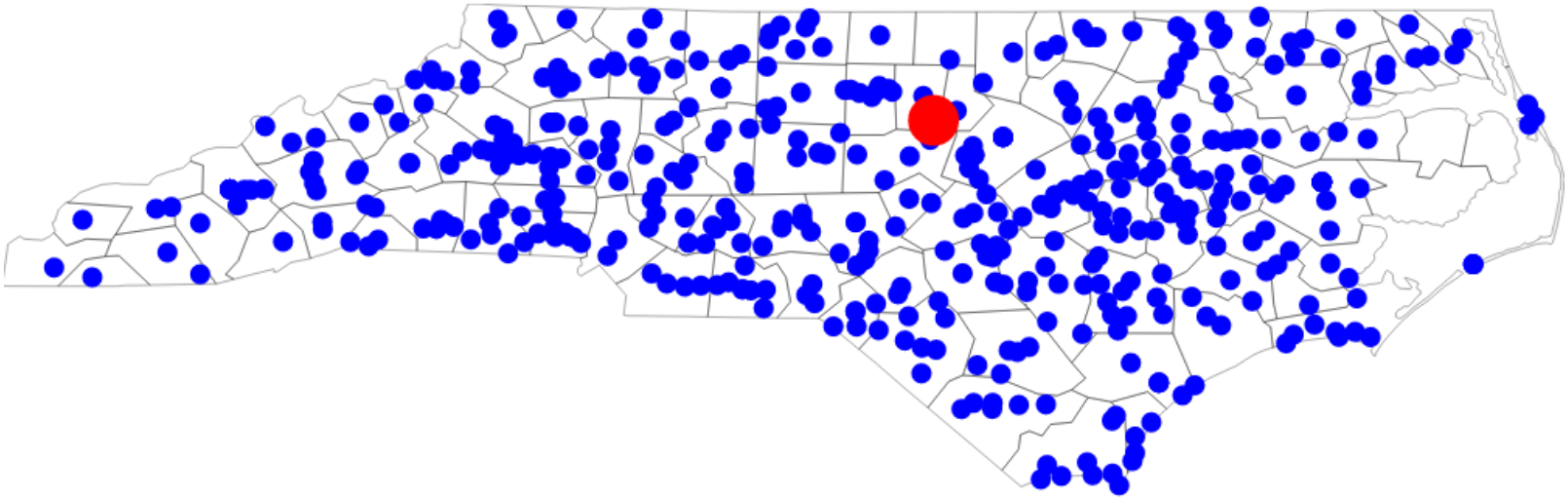

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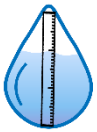
There is a vast amount of relatively untapped data

Key Finding

2

Decisions are being made now without data, so just get the data out there!

Which public water data? Public data needed to characterize and forecast water budgets



How much water is there?

What is it's quality?

How is it used (withdrawn, consumed or returned for different purposes)?

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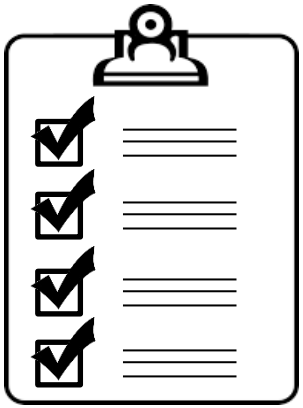
Key Finding

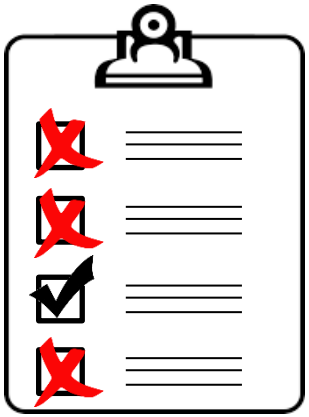
2

Decisions are being made now without data, so just get the data out there!

→ If we demand high data standards be met for data to be open, very little data may become open.

USGS
science for a changing world





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"…we have to make a decision whether or not we have the data. We'd rather have some data, even if it's bad – as long as we know that, than no data."

Key Finding

2

Decisions are being made now without data, so just get the data out there!

→ Data producers are responsible for making the quality of the data known

→ Data users are responsible for determining whether the data are fit for use

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Key Finding

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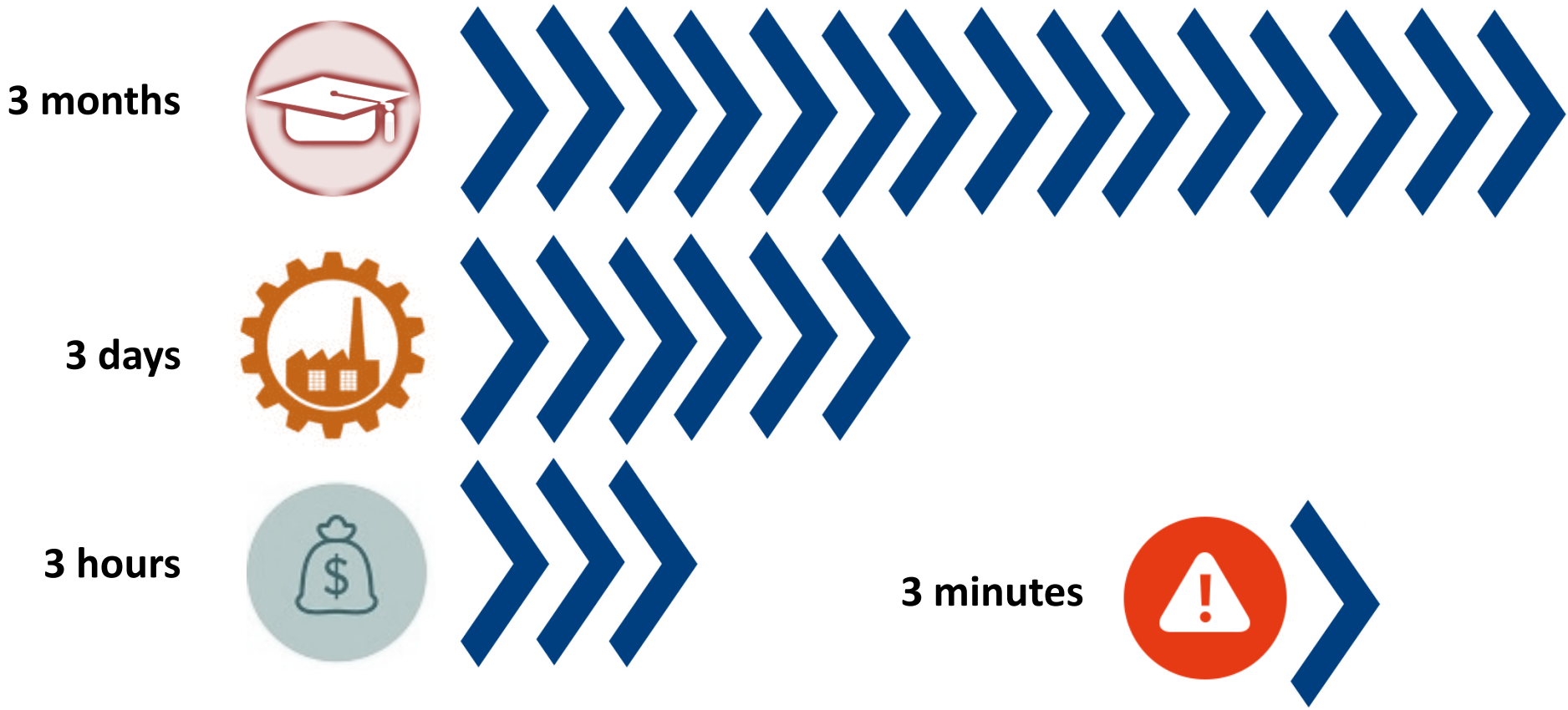

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The Rule of 3

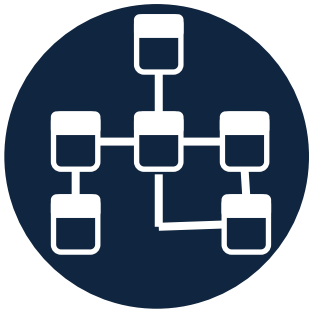
Next Steps for Key Finding 2

Action 1

Increase discoverability of water data

Action 2

Develop tools for opening existing, public water data and enable the use of those tools by data producers



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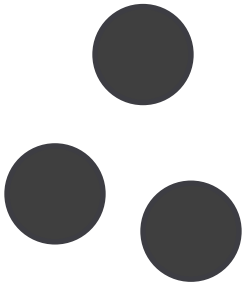
Key Finding

3

The Internet of Water

Data Producers



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Key Finding

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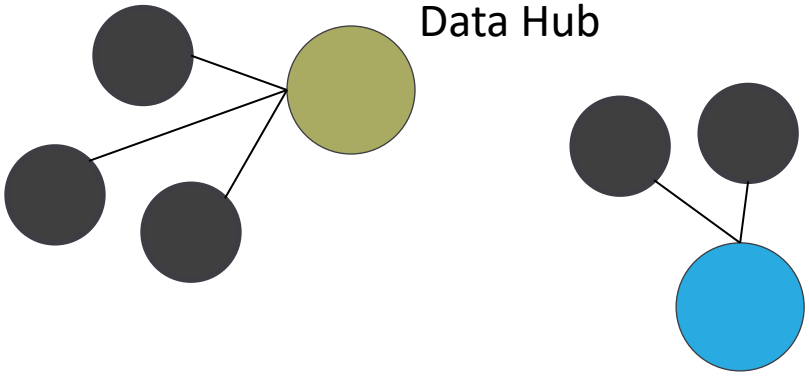
The Internet of Water

Data Producers

Data Hub



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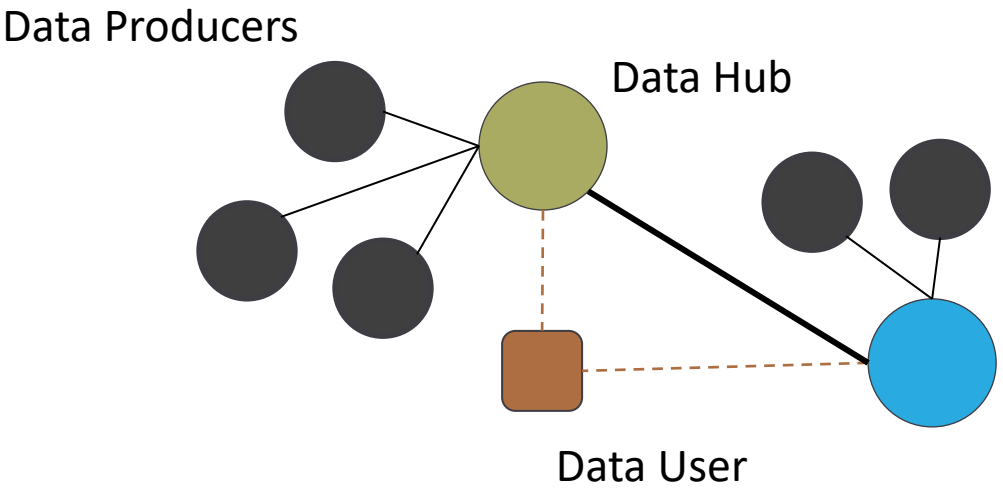

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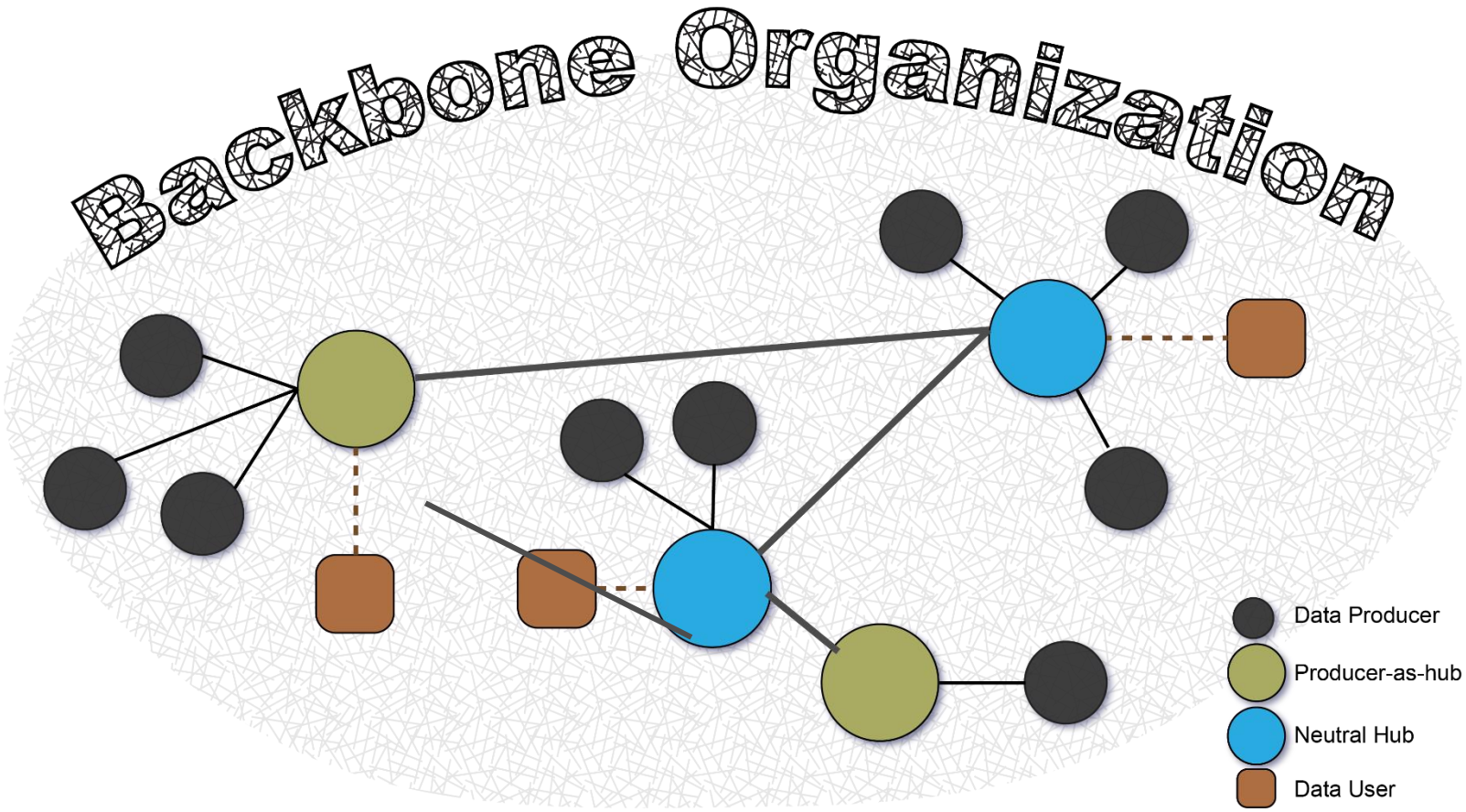

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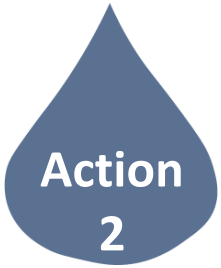
Where is the Internet of Water now?

Providing resources to existing hubs to expand the number of producers, mission, and connection with other hubs.



Creating the backbone organization to make a effort to push the Internet of Water forward.

1. Advocacy and Marketing
2. Non-Technical / Technical Support
3. Advising
4. Coordination

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https://www.aspeninstitute.org/publications/internet-of-water/

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